Georgia Department of Natural Resources

Environmental Protection Division • Air Protection Branch
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Mark Williams, Commissioner
F. Allen Barnes, Director
James A. Capp, Branch Chief

February 24, 2011

Mr. William S. Apple
Sage Environmental Consulting, L.P.
894 Banford Court
Marietta, GA 30068

Forwarded to: bill@sageenvironmental.com

Subject: **Review of Air Dispersion Modeling Protocol**
Chambers R & B Landfill, Banks Co., Georgia

Dear Ms. Connell:

We have reviewed your air quality dispersion modeling protocol dated January 7, 2011, which addresses the proposed modeled conformance of Chambers R&B Landfill's (R&B) proposed emission sources with applicable air quality standards. We find that it generally conforms to the procedures and guidelines we use to assess Prevention of Significant Deterioration (PSD) modeling projects. However, we do have the following comments:

1. We note you propose to perform a modeled evaluation of a normal operations scenario (6 internal combustion engines fueled with landfill gas, LFG) and an alternative operating scenario, incorporating the use of a leachate concentrator, LC. Discussions of the project with the GA Environmental Protection Division's (EPD's) Stationary Source Permitting Program have led us to assume the landfill may wish to evaluate additional operating scenarios. Some of these are scenarios involving fewer engines, offset by the operation of selected flares. We suggest R&B evaluate it's two proposed scenarios during the determination of Significant Impact Distance (SID) for each modeled pollutant. We further suggest that any other alternative operating scenario(s) be modeled during refined, cumulative modeling, as may be necessary. One single such worst-case scenario that might make other scenarios negligible is to model all engines (or 3.x engines with the LC?) together with all flares. Limited stack characteristics appear to have been provided for the LC in the protocol, not including it's proposed location. This makes it difficult for us to determine a unique worst-case scenario. Other alternative scenarios that may be evaluated during cumulative modeling of PM species and NO2 include: All flare-only operation, and some LFG-based mix of engines/LC and flares.

2. As you may be aware, EPA has recently proposed to extend the existing CO NAAQS. With no control equipment proposed for the engine exhaust, there appears to be no reason to model a start-up, shut-down, or malfunction scenario for any pollutant. For this reason, the pre-2008 EPA guidance (see the attached list of references, and those cited in your protocol) should be sufficient to address CO modeling. We suggest modeling each of the two scenarios described in (¶1) and proposed in the protocol using a concatenated file of meteorological data containing the hourly observations of all five years, with each scenario characterized as a source group in a single model input file. Such a model will need to be run twice, once with meteorological data compiled with the surface characteristics of the Athens, GA National Weather Service (NWS) station, and once with meteorological data compiled with the R&B site surface characteristics. It is not considered likely that the CO Significant Impact Levels (SILs) will be exceeded by the maximum predicted impacts, so there appears to be no need to address cumulative CO modeling at this time.

3. Particulate matter as PM10 and PM2.5 may be modeled to determine the respective pollutant short-term SIDs, if any, for both alternative scenarios proposed in the protocol, in a manner similar to CO. The annual SIDs, if any, of both pollutants and both alternative scenarios must be modeled on a year-to-year basis (PM10 for its Increment SID, and PM2.5 for its NAAQS SID). In the cumulative model, if required, fugitives from roads and earth-disturbing activities will need to be included as on-site emission sources in all alternative operating scenarios (see discussion in ¶1). Please provide (in the modeled air quality assessment) dimensions and/or alternate emission source characteristics for all fugitive sources modeled, and indicate how such dimensions are represented in the model(s). Fugitive emissions from trafficked roads should be modeled using emission rate assessment guidance from AP-42. Emissions from dozing, compacting, and other earth-disturbing activities should also be evaluated using AP-42 guidance. The 24-hr NAAQS design concentration may be directly modeled using a five-year concatenated file of hourly meteorological observations. Cumulative models of PM10 and PM2.5 will need to be modeled against each five-year set of meteorological data, as discussed in ¶2.

4. Nitrogen dioxide (NO_2) may be modeled as NOx. GA EPD requests that such difference be noted at any point in the air quality analysis where it may make a difference. GA EPD can approve the proposed Steps # 1 and #2 NOx modeling procedures indicated in the protocol. We note that Step #3 may be allowed, depending on the identified circumstances. Step #4 may be approved IF sufficient supporting materials identifying the technique(s) used to resolve the annual 98 percentiles of the 1-hr daily maximum concentrations are provided, recalling that these will need to be receptor-specific-averaged over the five-year period. Step #5 may also be approved, provided on the circumstances.

   All NO_2 cumulative modeling must be performed at least twice, in part to address the meteorological representation issue, and otherwise, depending on the number of alternative operating scenarios that must be evaluated. The CO modeling cannot be assumed to identify the worst-case NO_2 meteorological data because of the need to model the flares (and other scenarios?) to identify the cumulative NO_2 design concentration.

5. Note, the largest SID for each pollutant, regardless of time-averaging period, will establish the size of any model screening area to be inventoried for offsite sources of that pollutant (PM2.5, PM10, or NO_2) for cumulative modeling. The "20D" screening technique may be used, but the screening should be conducted using both a short-term "d" and a long-term "D" (see attached guidance, 20Dscren.pdf). No source within the pollutant-specific largest SIA may be screened from the cumulative inventory. Also, the pollutant-specific emissions of facilities within 2 km of each other outside the SIA should be added prior to applying the 20D screening test. Please use the applicable procedure cited in the current version of the AERMOD Implementation Guide to address any horizontal emissions and/or rain-capped stacks in the models. The Banks Co. Air Quality Control Region minor source baseline dates for PM/PM10 and annual NO2, per GA EPD records, have not yet been triggered. GA EPD would suggest one change to Table 1-1 of the protocol: The annual Class I SIL is 0.2 $\mu g/m^3$. Were cumulative Class I increment to be assessed, the short-term (PM10, in this case) standard would be assessed with the highest 2nd high PM10 concentration modeled. On Table 5-1, the 1-hr NO2 background ambient concentration should be 65.8 $\mu g/m^3$, based on the June 29, 2010 EPA memo requiring the maximum 1-hr concentration over a 3-yr period to be used for this purpose. The 24-hr annual average of the daily 98th percentile concentrations of PM2.5 in Athens ('07-'09) is 27.3 $\mu g/m^3$, the annual average PM2.5 concentration in Athens ('07-'09) is 12.1$\mu g/m^3$.

6. Based on information on Table 4-1 of the application, and the information cited in Section 3 of the Modeling Protocol, the Q (the sum of visibility-affecting emission rates, in tons-per-year,

calculated on a maximum 24-hr emission rate basis) over d (the distance between the project and each Class I area within 300 km of the project site, in km) of the project appears to be less than 10. For this reason, according to the 2010 FLAG guidance, the Federal Land Managers' Air Quality Related Values Work Group (FLAG) Phase I Report – Revised 2010, the project is automatically exempted from conducting any specific Class I Air Quality Analyses for the Federal Land Managers (FLMs). However, U.S. EPA will require an analysis of Class I PM10, PM2.5, and NO_2 Increment consumption by the project. In this situation, where use of the CALPUFF model is not required by an FLM, U.S. EPA considers it acceptable to assess project impacts against the Class I area SILs using AERMOD with receptors at 50 km from the project site. At that distance, model receptors should be located at 1 degree intervals along an arc positioned between the facility and the Class I areas of interest, as indicated on Figure 8-1 of the protocol. All project sources should be located at the same elevation as the simulated Class I area receptors (flat-plane scenario). In the event such screening modeling indicates an excess of a relevant Class I SIL, the CALPUFF model must be used to refine the Class I Significance by comparison of impacts with the relevant SIL(s). If the relevant SILs are still exceeded, GA EPD should be contacted to discuss cumulative Class I Increment assessment. The PM10 and NO_2 SILs are compared to the maximum modeled, screening or refined impact. The PM2.5 SILs must be assessed using maximum impacts averaged over the meteorological period of record on a receptor-specific basis as is done with Class II modeling. The AERMOD screening assessment of Class I SILs is recommended to be included as a separate receptor group in each Significance model.

7. General Modeling considerations: Please use BPIPPRM (version 04274) to assess building downwash dimensions and GEP stack heights. Stacks of heights equal to, or in excess of GEP height should be modeled using the GEP height. Stacks below GEP height must be modeled to assess building downwash influences on their plumes. Please use AERMAP (version 09040) to assess all model receptor elevations above sea level with the USGS NED database (all model coordinates, including building corners, should be referenced using the NAD83 datum). For modeling, please use AERMOD (version 09292, or a more recent version which may be released by EPA) for all criteria pollutant modeling. For modeling air toxics, please use the ISCST3 model (version 02035) with receptors assigned terrain elevations, use the Athens meteorological data set downloadable from the georgiaair.org website for ISCST3 modeling. It is assumed the project sources are located on a common plant grade elevation. This may not be the case for facility sources. Please assess source elevations using AERMAP, if appropriate.

8. The extent of the receptors modeled should be at least that which was proposed in the modeling protocol. All design concentrations should be resolved to the nearest 100 meters. The SID receptors should have at least one 100-m spaced receptor located farther from the project than the farthest receptor showing a concentration $\geq$ to the respective SIL.

9. Air toxics modeling should be conducted in accordance with the GA EPD Guideline for Ambient Impact Assessment of Toxic Air Pollutant Emissions, 1998. There may be short-term (STEL or Ceiling-based 15-minute averaged limits) and long-term (RfC, RBAC, PEL, TLV, or REL-based 24-hour or annual based limits) Acceptable Ambient concentration (AAC) limits. The short-term limits are modeled using the maximum fifteen-minute emission rate, entered into the model as an equivalent hourly rate. The short-term modeled output is corrected from a 1-hr average concentration to a fifteen-minute concentration by multiplying by the factor of 1.32 for comparison to the applicable short-term AAC(s). The time-averaging period of the long-term assessments is either annual (for IRIS values of RfC or RBAC) or 24-hr (for all other bases of AAC limits, such as PEL, TLV, and REL), but not both. GA EPD no longer requires calculation of an AAC value using NIOSH LD_{50} data. The annual AAC(s) may be assessed with 5-yr period concentrations. This enables each pollutant to be modeled with a concatenated 5-yr period of

hourly meteorological observations to address all AAC time-averaging periods. If air toxics are modeled with ISCST3, no downwash influences should be considered. If AERMOD is used to assess air toxics conformance, building downwash effects must be considered.

10. Please copy GA EPD modeling staff on all correspondence with any FLM related to the review of this project. We concur with your postulate that no Class I FLAG assessment is necessary.

Please contact me at 404-363-7095 if you have any questions. If EPA issues guidance, or models which you believe may affect the modeling of this project subsequent to this protocol approval letter, please contact me to verify the ability to incorporate such guidance or models in the assessments of this application.

Sincerely,

Peter S. Courtney, P.E.
Environmental Specialist
GA EPD

Attachments: Generally Applicable Modeling References
20Dscren.pdf
Athens/Athens 1989-1993 Meteorological Data (sent in June, 2010)

Generally Applicable Modeling References

2005, 40 CFR 51, Appendix W, Guideline on Air Quality Models

1990, Draft New Source Review Workshop Manual.

2004, USER'S GUIDE FOR THE AMS/EPA REGULATORY MODEL - AERMOD (EPA-454/B-03-001, September 2004) (version 04300)

2009, ADDENDUM, USER'S GUIDE FOR THE AMS/EPA REGULATORY MODEL - AERMOD (EPA-454/B-03-001, September 2004), October 2009 (version 09292)

2009, AERMOD IMPLEMENTATION GUIDE, Last Revised: March 19, 2009

2004, USER'S GUIDE FOR THE AERMOD TERRAIN PREPROCESSOR (AERMAP, version 04300), EPA-454/B-03-003, October 2004.

2009, ADDENDUM, February, 2009, to USER'S GUIDE FOR THE AERMOD TERRAIN PREPROCESSOR (AERMAP version 09040), EPA-454/B-03-003, October 2004.

2004, USER'S GUIDE TO THE BUILDING PROFILE INPUT PROGRAM (BPIP), updated to include the PRIME algorithm (BPIPPRM, version 04274, EPA-454/R-93-038, (Revised April 21, 2004), (Electronic copy only).

1995, USER'S GUIDE FOR THE INDUSTRIAL SOURCE COMPLEX (ISC3) DISPERSION MODELS, VOLUME I - USER INSTRUCTIONS, VOLUME II – DESCRIPTION OF MODEL ALGORITHMS. EPA-454/B-95-003a & b, September, 1995. Vol. a includes 02035 instructions.

2002, USER INSTRUCTIONS FOR THE REVISED ISCST3 MODEL (dated 02035), Feb 4, 2002.

1995, SCREEN3 Model User's Guide, EPA-454/B-95-004, model version 96043.

2010, Guidance Concerning the Implementation of the 1-hour NO2 NAAQS for the Prevention of Significant Deterioration Program, EPA Memorandum from Stephen D. Page, Director, OAQPS, to EPA Regional Air Division Directors, June 29, 2010.

2010, Guidance Concerning the Implementation of the 1-hour SO2 NAAQS for the Prevention of Significant Deterioration Program, EPA Memorandum from Stephen D. Page, Director, OAQPS, to EPA Regional Air Division Directors, August 23, 2010.

2010, Modeling Procedures for Demonstrating Compliance with PM2.5 NAAQS, EPA Memorandum from Stephen D. Page, Director, OAQPS, to EPA Regional Modeling Contacts and selected OAQPS Personnel, March 23, 2010.

2010, Prevention of Significant Deterioration (PSD) for Particulate Matter Less Than 2.5 Micrometers (PM2.5)--Increments, Significant Impact Levels (SILs) and Significant Monitoring Concentration (SMC), Final rule, Federal Register vol. 75, No. 202, pgs. 64863-64907, October 20, 2010.

1998, Guideline for Ambient Impact Assessment of Toxic Air Pollutant Emissions, Revised June 21, 1998, Georgia Environmental Protection Division (GA EPD).

2006, Interim Dispersion Modeling Guidance, Last Revised Dec 28, 2006, GA EPD (georgiaair.org).